Geosat

APRS functions Manual

AVMAP
SATELLITE NAVIGATION

Your journey, Our technology

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I. Introduction

APRS is a method for sending and receiving position and other information over a radio transceiver.
The Geosat 6 APRS is ready to accept APRS inputs from a radio transceiver and to provide fix position output data to the transceiver in order to transmit its current position.
Geosat 6 APRS provides GPS location information for your transmitted APRS beacons, and it shows received APRS information on its map display.
The Geosat 6 APRS comes with an APRS cable for use with designated Kenwood transceivers
The input/output port used for APRS is the serial port on the right side of the Geosat 6.

APRS© was developed by Bob Bruninga, WB4APR

How to set-up your transceiver:

- Enter your call sign
- BAUD Rate=9600
- Waypoint=ALL
- Waypoint size=9 character (this as also called waypoint length)
- Beacon method = Smartbeaconing (if your device supports this)
- Waypoint output=ALL
- If you are using a Kenwood D72 turn off F-1 Internal GPS

How to set-up your Geosat 6 APRS:

The Geosat 6 APRS is defaulted to 9600 BAUD rate. If your radio device supports 4800 BAUD rate you can change this setting also on your Geosat 6 APRS in the APRS options page (Chap VIII). Touch the Options button in the APSR menu, touch Serial Port and then choose your option.

Connecting the devices:

Your Geosat 6 APRS is supplied with an APRS cable: the 3 pole end (the one with 2 black rings) goes into the 2.5mm socket of your radio or TNC device.
The 4 pole end (the one with 3 black rings) goes in the top 2.5 mm I/O socket of the Geosat 6 APRS; make sure they are really snug in the socket.
foto connettore

For a detailed set-up explanation of the Kenwood TH-D7, TM-D700, TM-D710 and TH-D72 read Annex A.

III. Activating the APRS mode

To enter in the APRS mode, open the main navigation menu and press the APRS Functions button. To enable or to disable the APRS mode, press the Enable/disable APRS Button in the APRS Functions Menu. Push this button to enabled or disable the other buttons.

The APRS Functions menu includes four buttons:

- Disable/Enable APRS
- APRS contacts
- Messages
- Options (APRS Settings)

The Messages function when a Geosat 6 APRS is connected to compatible radio transceiver or modem supporting the Messaging function. Find the list of Geosat 6 APRS compatible radio transceivers and modems supporting messaging on line www.avmap.us or/and www.avmap.it.

APRS icons on the map:

As soon as you connect Geosat 6 APRS to your transceiver you will start receiving APRS positions called "APRS contacts". Geosat 6 can store up 1000 APRS contacts and display them on the map.

You can watch APRS activity right on the screen and you can distinguish between fixed and mobile APRS stations. Static positions are represented by blue bulls-eye icons along with the associated call sign. If the Geosat 6 APRS is used with a Kenwood D710A/E or TH-72A/E and if it is set in the KENWOOD format sentence, it supports standardized APRS icons.

To get more info on an APRS contact on the map, zoom in and touch it, the Call sign will appear in the info bar in the bottom of the screen, Touch it to view the Full info page.

APRS contacts list:

You can also see the list of received contacts; you can

sort them or delete them by entering the APRS contacts Menu. To enter in the APRS Contacts Menu, press the APRS Contacts button in the APRS Functions menu. The APRS contacts folder shows all APRS contacts received from the connected radio. Touch one APRS contact on the list to open the Full info page.

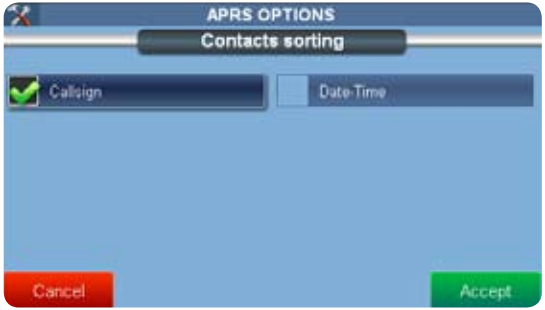
Full info on APRS contacts:
You have detailed info on stationary and moving APRS contacts as Geosat 6 APRS fully takes advantage of the Kenwood format sentence.

This 'Tactical mode' allows you to select an APRS contact from the APRS contact list, or from the map to see on the full info page: call sign and position, time stamp of its last report as well as (for moving APRS contacts) its speed, course and altitude.
The Full info page show the info about the APRS contact and 6 buttons on the right column:

- Delete: Touch this button to delete the selected APRS contact from the APRS contact list.
- Save as contact: touch this button to save the selected APRS contact as a normal Contact. This may be useful to save the Call Sign, telephone number and address (for fixed stations), if you need to reach them even when the APRS functions are disabled. Contacts can be accessed from the Main Menu / My Data page.
- Show on Map: touch this button to see the position of the contact on the map.
- Send Message: Select this button to send a message to the selected APRS contact. (This function is only available when a compatible radio transceiver or modem supporting Messaging is connected to the Geosat 6 APRS).
- Set as Target: touch this button to set the selected APRS contact target to be tracked. (Read Chap.VII)
- Go To: touch this button to set the selected APRS contact as destination. The navigator will calculate the route to drive from your current position to the selected APRS contact.

V. Managing APRS contacts

Geosat 6 APRS can auto-delete the received APRS contacts' positions after a set timeout.
You can also sort your APRS contacts by alphabetical order or receiving time.
Touch the Options button in the APSR menu.



Contacts sorting:
Touch Contact sorting, and then choose to sort the APRS Folder on call sign or on date-time.

Contacts Timeout:
Touch Contacts timeout and can choose to delete automatically contacts from the APRS Contacts Folder after the indicated time period. It is important to have your time correctly set on your TNC and on your AvMap Geosat 6 APRS.

IV. Messaging to APRS contacts

Back
Map
Send Message
Message text:
OK, SEE YOU TOMORROW AT 8 PM.
BTW, COULD YOU ASK ANNA TO BRING HER HI FI STEREO? I'LL BRING MY CD COMPILATIONS AND A WINE BOTTLE.
LET ME KNOW ABOUT SNACKS AND DRINKS.
Edit Text
Read it to me
Select Receiver
Send to:
ANDREA
Send

The Messages function when a Geosat 6 APRS is connected to compatible radio transceiver or modem supporting the Messaging function. Find the list of Geosat 6 APRS compatible radio transceivers and modems supporting messaging on line www.avmap.us or/and www.avmap.it.

Once the Geosat 6 APRS has connected to a modem, the messaging menu will remain available to read received messages also when the modem is not connected anymore.
In the Message Menu you can choose to send a message, read received messages, read sent messages and check the outgoing messages.
Screenshot

Sending messages:

- Enter the Messages menu
- Touch new Message and digit the text with the virtual keyboard.
- To digit special symbols, touch the symbols button

and the special symbol virtual keyboard will be displayed. To go back to the normal keyboard touch ABC.
- To change the characters from small to CAPITAL, use the buttons on the right: "A" for the Capital keyboard or "a" to go back to the small keyboard.
- Once the text has been completed, touch enter.
- Insert the recipient's by touching Edit Recipient. Now you can select one or more recipients from the APRS contact list.
- Touch "accept".
- Touch send message.

Once the message has been sent, the Software will go back to the map and the message will be saved in the Sent Message folder.

Receiving Messages:
When you receive a Message from an APRS contact, a warning is displayed on the map and you can choose to open the message or to read it later. In both cases, the message is saved in the received message folder, so you can read it anytime.
If you choose "Read now", the message is displayed, to avoid distractions you can touch Read it to me, and the Geosat 6 APRS will read the message out loud for you thanks to the Text-to-speech technology.

You can choose to receive pop-up messages for your personal messages or also for bulletin messages sent to "ALL" in the APRS options menu. Touch the Options button in the APSR menu, touch Messages on Map and then choose your option.

VII. Setting an APRS contact as Target

On the full info page of the APRS contact, you can set the APRS contact as Target, by touching the Set as Target button. This allows you tracking a moving APRS contact: you will have a shortcut on the map to display the position of the target, and you will be able to monitor info relative to the target in the data boxes in the left side of the map.

Intercepting the target:

After you set the APRS contact as Target, a pop-up window asks you if you want to set this target as your destination too.

If you touch “Yes”: the map will be displayed and Geosat 6 APRS will calculate the route to intercept the target. This way, not only you will be able to monitor the target but you will also navigate towards it getting rerouting instructions when its new position is reported.

If you touch “No” the APRS contact is set as target to be tracked even if no destination or another destination is set. To display the map touch the Map button in the upper

right corner of the screen.

Tracking the position of the target:

Once you have set the APRS contact as target, the Target button with a target icon and the target CALL SIGN is displayed in the lower right corner of the map. By default the map is centered on your position, touch the target button to centre the map on the target.
Screenshot

To go back to view your own position on the map, touch the car button in the lower right corner of the map.
Screenshot

Monitoring the info in the target:

While navigating, three data boxes appear on the map (on the left side in the horizontal view or on the bottom in the vertical view). Once you have selected an APRS contact as target, these data boxes show relevant information of the selected target. To change displayed information on the data box, touch the data box on the map and select the data from the list that would like to display on the map:

- Target ID
- Target Lat/Lon
- Target Speed
- Target Course
- Target Altitude

In the APRS options menu you can edit settings for the contacts management: Contacts sorting (Chap V), Contacts Timeout (Chap V), for Messages display (Chap VI), and for the Serial Port (Chap II).

IX. Compatibility

The Geosat 6 APRS comes with an APRS bi-directional RS-232 APRS interface compatible with all APRS Kenwood amateur radios models and with all the TNC (Terminal Node Controllers) that support NMEA format sentence.

Current APRS ready Kenwood transceivers include:

- TH-D7A/E
- TM-D700A/E
- TM-D710A/E
- TH-D72A/E

Kenwood format sentence compatible radio transceivers

If the radio's TNC supports the Kenwood format sentence you can get the best out of your Geosat 6 APRS: you are able to see APRS standard icons, full tactical information for APRS contacts such as COG, SOG, Lat-Lon, altitude, and time stamp allowing time contact sorting.

Other NMEA sentence radio transceivers

If the radio's TNC does not support the Kenwood format sentence, you can see only two types of APRS icons: a bull's eye for APRS stations, and a triangle for moving APRS contacts. You do not get the time stamp, so no contact time out sorting is possible.

Type of radio transceiver	Geosat 6 APRS functions/ Kenwood sentence compatible	NMEA sentence only
APRS icons	All standard icons	Only fixed / moving
APRS contact Time Stamp	Yes	No
Contact time out sorting	Yes	No

X. Technical Specifications

Hardware

- Dimensions and weight: 133.6 x 83.4 x 21 mm; 270 g
- Memory Support: Secure Digital
- Display: touch screen LCD 4.8”, 65536 colors
- Resolution: 480 x 272 pixels
- Automatic Brightness Control
- Processor: 520 MHz
- GPS receiver: u-blox 50 channels
- RAM: 64 MB
- Built-in Li-Ion rechargeable battery
- Mini USB port
- Serial port for Bi-directional NMEA communication
- Built-in speaker
- Audio output for earphones
- Included Accessories: smart mount, car charger, power supply cable, USB cable, APRS cable

Software

- Operative System: Windows CE
- Software: AvMap with free updates
- 2D, 3D and night view
- Multiple destinations: up to 10 waypoints
- The best route: the fastest, the shortest
- Customize your trip: choose to avoid Toll roads, walkways, ferry routes, u turns, highways, unpaved roads, built-up areas.
- Lane Assistant
- Stop planner
- Trip Computer
- Turn-by-turn vocal instructions with text-to-speech

APRS operations

- Full bi-directional RS-232 APRS communication
- Compatible with NMEA and Kenwood format sentences 4800 and 9600 baud rate

- Intercept to target function
- Tactical mode
- Store up to 1000 APRS contacts
- APRS contacts auto-delete
- APRS contacts sorting
- Standard APRS icons

Appendix: Units setup

Set up instructions for:
Geosat 6 APRS APRS
with the following devices:

- Kenwood TM-D710 A/E
- Kenwood TM-D700 A/E
- Kenwood TH-D7 A/E
- Kenwood TH-D72 A/E

Introduction

APRS is a method for sending and receiving position and other information over a radio transceiver.
The Geosat 6 APRS is ready to accept APRS inputs from a radio transceiver, and to provide fix position output data to the transceiver in order to transmit your current position.
The Geosat 6 APRS comes with a cable that is pre-wired for use with designated Kenwood radios. The input/output port used for APRS is the same port that is used for TMC, and is labeled TMC on the back of the Geosat 6 APRS . Due to the multi-use of the TMC port, it is not possible to operate APRS and TMC simultaneously.

Set-up for the Kenwood TH-D72A/E with the AvMap Geosat 6 APRS

These instructions provide the essential information necessary to configure your AvMap Geosat 6 APRS and your Kenwood TH-D72A/E HT for basic APRS operation. After you have achieved basic operation and have some experience with the system, you will want to adjust various parameters to more closely meet your particular environment and operating requirements.

Note: These instructions assume you have basic operating knowledge of both the AvMap Geosat 6 APRS and the Kenwood TH-D72A/E. They also assume that both units are at factory default settings. If you have problems getting the system to work, return both units to factory default. Perform these instructions, and then reset any other settings to your preference. Do not connect the two units until the configuration of both units has been completed.

AvMap G6 APRS Setup

• Make sure the interface is set to 9600 (this is the default).
• Make sure that contacts are displayed.
• Make sure that APRS Contact timeout is Off.
The Geosat 6 APRS is now set up and ready to interface with the radio.

Kenwood TH-D72A/E Radio Setup

• Turn the TH-D72A/E ON.
• Press the F button.
• Use the up/down/OK/Esc control to select and set the following functions:
- F-1 – Int. GPS – Off
- F-7 – Voice Alert – Off
• Press Esc to exit the function menu.
• Use the A/B button to select the desired radio side for APRS.

• Press the VFO button and adjust the frequency to your standard APRS frequency (144.39MHz in the US).
• If necessary, press F-Shift to remove + and – from the display.
• If necessary, press Tone to remove the T, CT, DCS, and D/O icons from the display. The icon position should be blank.
• Press Menu button and set or verify the menu settings below. Leave all other settings at default, for now. Note: only important default settings are included here.
• Press the Menu button again to close the Menu.

Menu Number	Description	Setting
110	Battery Saver	Off or 0.03 sec
111	APO	Off (during setup)
120	Audio Balance	Mid-point (during setup)
300	My Callsign	(Your callsign-SID)
301	Beacon Type	APRS
302	APRS Lock	Off
310	Data Band	Set to A or B depending on the side you selected for the APRS frequency.

Menu Number	Description	Setting
311	Data Speed	1200 bps
330	Baud Rate	9600 bps
331	Input	On
332	Output	On
340	Format	KENWOOD
341	Length	9-Character
342	Output	All (during setup)
370	Speed	On (during setup)
371	Altitude	On (during setup)
372	Pos. Ambiguity	Off (during setup)
3C0	Icon	Select desired or leave set to Kenwood
3D0	Method	Auto (during setup)
3D1	Initial Interval	1 min (during setup)
3E0	Decay Algorithm	Off (during setup)

Menu Number	Description	Setting
3E1	Prop. Pathing	Off (during setup)
3H0	Type	New-N
3H1	WIDE1-1	On
3H2	Total Hops	2 (during setup)
3J0	TX	Off
3K0	Digipeat (MyCall)	Off
3T0	RX Beep	All (during setup)
3T1	TX Beep (Beacon)	On (during setup)

Making it all work!

The Kenwood TH-D72A/E is now ready to interface with the Geosat 6 APRS.

Now that the configuration is complete, it's time to see if it will work.

1. Turn off the Geosat 6 APRS and the TH-D72A/E.
2. Connect the two units using the data cable provided with your AvMap Geosat 6 APRS. Plug the four-

conductor plug, with three black insulating rings, into the I/O port on the Geosat 6 APRS. This is the top jack on the right side of the Geosat 6 APRS. Make sure the plug is firmly seated in the jack. Open the COM cover on the TH-D72A/E and plug the three-conductor plug (two black insulating rings) into the COM port. Again, make sure it is firmly seated. A common problem with operation failure is not having the plugs firmly inserted in the units, or having the connections reversed. Double check your connections.

3. Turn on the Geosat G6 APRS and the TH-D72A/E. Wait until the Geosat 6 APRS has acquired sufficient satellites to establish a 3D position. A blinking GPS icon (not iGPS) should then appear in the upper right corner of TH-D72A/E display.

4. Set the volume at about 1/3 volume. If there is APRS activity in your area, you should here the brief "growl" of packet transmissions. You will hear a short beep when you receive an APRS signal, a longer beep when you transmit your position, and a double (high-low) beep when you receive your position back from a digipeater.

Now that you have a working system, you will want to decrease your beacon rate, and change other settings according to your desired operating method. Read the APRS section of the Kenwood TH-D72A/E CD manual. This manual provides additional information on the functions of the various APRS controls, and how to set them for your desired operating conditions.

Troubleshooting

If you do not see a flashing "GPS" signal on the upper right hand corner of the TH-D72A/E, or APRS stations are not appearing in the APRS Contacts list on the Geosat 6 APRS, then the data cable may not be fully

or correctly seated.

1. Remove one plug and assure that it is the correct plug for that unit and is plugged into the correct port, according to the description in the previous section of these instructions. Return the plug to the proper port and firmly push it in.

2. Check that the cord at the other end is in the correct port and firmly press on the plug to assure it is properly seated.

3.Check the cord for continuity and no shorts, using an ohmmeter, especially if it is a home brewed data cable.

4. Verify that the Geosat 6 APRS is computing a position fix.

5. Listen to your APRS frequency on the TH-D72A/E or on a different radio to verify there is APRS activity in your area.

6. Reread and verify the setup sections of these instructions.

7. Perform a Partial Reset of your TH-D72A/E per the instructions on page RESET-1 of the CD manual, then, repeat the setup instructions. A partial reset will not erase your memory channels, but will set all other settings to their default values.

Set-up for Kenwood TM-D710 A/E with the AvMap Geosat 6 APRS

NOTE: These instructions assume you have basic familiarity with operation of both the TM-D710 A/E and the AvMap Geosat 6 APRS .

a. Turn the radio ON.
b. Press the “F” key to access the Setup Menu.
c. Press the MHZ knob.
d. Turn knob to select APRS.
e. Press the MHZ knob again enter the menu selection mode

Basic Setting Menu #600

a. Enter your call sign.
b. Set Beacon Type to APRS.
c. Turn the MHZ knob to scroll through menus.

Internal TNC Menu # 601

a. Do not make any changes. Leave all settings at “Default.” Be sure that 1200 Bps is selected

GPS Port Menu #602

a. Change the Baud Rate to “9600”
b. Set the Input to “GPS”
c. Set the Output to “Waypoint”

Waypoint Format Menu # 603

a. Set Format to “Kenwood”
b. Change NAME to “9-CHAR”
c. The Output setting should be set to “ALL”

Beacon Information Menu # 606

a. Speed setting should be turned ON
b. Altitude setting should be turned ON
c. Position Ambiguity should be turned OFF

Beacon TX Algorithm Menu # 611

a. Set the Method to “Auto”

b. Press ESC to return to the main page

c. Change the APRS Frequency to: 144.390

d. Select TNC and press to turn on APRS 12

e. Press “BCON” to turn on -- BCON will appear in the upper right corner The Kenwood Radio is now ready to interface with the Geosat 6 APRS .

Making it all work!

a. Make sure both the Kenwood TM-D710 and AvMap Geosat 6 APRS are turned OFF!

b. Connect the four pole 2.5mm communication cable end to theserial port of the Geosat 6 APRS (show picture of Geosat 6 serial port) and the three pole 2.5 mm end to the D710’s GPS receptacle. IMPORTANT! These are easily reversed and hooked up backwards…also…when connecting to the Geosat 6 APRS make sure you plug into the serial input…not audio input.

Check for a good click into the unit.

c. NOW POWER UP BOTH UNITS!

CAUTION!

If you interface the units and do not see a flashing “GPS” signal on the upper right hand corner of the Kenwood, then the APRS cable may not be plugged-in all the way or correctly. Please check that the cord is plugged into the proper ports and plugged-in all the way.

Also verify that the Geosat 6 APRS is receiving a GPS fix. Once your Geosat 6 APRS and radio are working properly together, you will see an indication on the radio (if it provides such) that it is receiving GPS position data. In addition, as the radio provides position information to the Geosat 6 APRS , stations will be plotted on the screen. Depending upon the location of plotted stations, you may need to expand the scale of the

map, or translate the map to a different location in order to see them. You can also verify this in the APRS Contacts folder. The Geosat 6 APRS will detect whether a station is moving based on the data received from that station.

Screen #	Item	Select/Enter
3-1	CALL SIGN	{your call sign}
3-2	GPS UNIT- NEMA FORMAT	{NEMA96}
3-3	WAYPOINT	{9 DIGITS NEMA}
3-5	POS AMBIGUITY	{OFF}
3-7	POS LIMIT	{OFF}
3-B	PACKET PATH	{WIDE1-1,WIDE2-2}
3-C	PACKET TRANSMIT METHOD	{3 MIN.} NOTE: Smaller times (<5min) are for mobile units while stationary stations will use longer times (~10 min. and up)
3-D	PACKET TRANSFER RATE	{1200 bps}

Set-up for Kenwood TM-D700 A/E with the AvMap Geosat 6 APRS

NOTE: These instructions assume you have basic familiarity with operation of both the TH-D700 A/E and the AvMap Geosat 6 APRS .

a. While programming the Kenwood TM-D700 and/or the AvMap Geosat 6 APRS , the communication cable should be disconnected. Strange and/or bad things can occur if you fail to head this warning!
b. Starting with the Kenwood TM-D700. Note: Items in [ ] are buttons and { } are items you enter and/or 'see' on the radio screen.
c. Turn on the radio.
d. Make sure that {T}, {CT} and {DCS} do not appear at the top of your Kenwood TM-D700 screen, if they do press the [TONE] button until none of these appear.
e. Press the menu button [MNU] and use the control knob to get to the APRS setup menu {APRS 3-X} (the X here can be any letter or number) and press the [OK] button to select/enter.
f. Use the [é] and [ê] buttons to go to different screens in the APRS menu and the [OK] button to select/enter that particular screen.
g. Once you make your selection and/or entry push the [OK] button again to save the selection/entry. Then go back to 'f.' above to get to the next APRS screen and enter all the Table 1 settings below.
h. Press the [ESC] button to leave the APRS setup screen and return the D700 user screen.
i. You can now power down the radio and it will keep your settings.

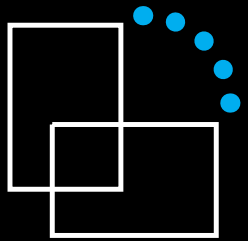
Screen #	Item	Select/Enter
2-1	CALL SIGN	{your call sign}
2-2	GPS UNIT	{NEMA96}
2-3	WAYPOINT	{9 DIGITS NEMA}
2-5	POS AMBIGUITY	{OFF}
2-7	POS LIMIT	{OFF}
2-B	PACKET PATH	{WIDE1-1,WIDE2-2}
2-C	DATA TX	{AUTO}
2-D	PACKET TRANSFER INTERVAL	{3 MIN.} NOTE: Smaller times (<5min) are for mobile units while stationary stations will use longer times (~10 min. and up)
2-N	PACKET SPEED	{1200 bps}

Making it all work!

a. Make sure both the Kenwood TH-D7 and AvMap Geosat 6 APRS are turned OFF!

b. Connect the four pole 2.5mm communication cable end to the serial port of the Geosat 6 APRS and the three pole 2.5mm end to the D7A's GPS receptacle. IMPORTANT! These are easily reversed and hooked up backwards; also when connecting to the Geosat 6 APRS make sure you plug into the serial port, not the audio input.

c. NOW POWER UP BOTH UNITS!
d. Make sure the D7A is on the two meter band and the channel is set to 144.390.
e. OK here we go! Press the [TNC] button on the D7A. This will open the {TNC} of your D7A and communications between the Geosat 6 APRS and D7A should now begin. NOTE: Make sure that the radio isn't in [TNC PACKET] mode.
f. DOES IT WORK?? Press the [POS] button. This will bring up the coordinates screen. IF the Geosat 6 APRS is talking to the D7A you should see the (degrees, periods and commas) blinking. if they are not blinking you are NOT communicating. Press the [POS] button again to return to the normal user screen.



www.geosat6.com